CAN-PC Interface

CPC-PCIe

User manual

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User manual CPC-PCIe V2

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Our products are continously improved. Due to this fact specifications may be changed at any time and without announcement.

WARNING: **CPC-PCIe hardware and software may not be used in applications where damage to life, health or private property may result from failures in or caused by these components.**

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1 Overview

1.1 Attributes

- CAN Interfaces for industrial applications
- Compact size for PCIe x1 slots
- CiA DS 102 and ISO 11898 compatible physical layer
- Equipped with up to four CAN controller NXP SJA1000
- Extended ESD-protection of the CAN controller
- Galvanic decoupling between PC and CAN bus (optional)
- Galvanic decoupling between individual CAN channels (optional)
- Easy programming based on direct mapping of CAN controller registers into PC memory area

1.2 General Description

CPC-PCIe is a PCI Express plug-in card for the CAN bus. Designed for industrial series applications CPC-PCIe has a robust and cost efficient layout. CPC-PCIe supports up to four CAN controller of type NXP SJA1000.

CPC-PCIe maps the CAN controller into the PC address space and thus allows access to CAN messages with low latency. Existing software for the supported CAN controller can easily be adapted. With CPC-PCIe the CAN communication may be handled either in interrupt controlled or in polled mode.

CPC-PCIe can optionally be delivered with galvanic decoupling of the CAN bus. The dual and four channel version has the additional option of galvanic decoupling between the CAN channels.

1.3 Ordering Information

10-11-200-20	**CPC-PCIe/SJA1000S** CAN plug-in board with one CAN controller NXP SJA1000
10-11-201-20	**CPC-PCIe/SJA1000S-GTIS** CAN plug-in board with one CAN controller NXP SJA1000, galvanic decoupling
10-11-210-20	**CPC-PCIe/SJA1000D** CAN plug-in board with two CAN controllers NXP SJA1000
10-11-211-20	**CPC-PCIe/SJA1000D-GTID** CAN plug-in board with two CAN controllers NXP SJA1000, galvanic decoupling
10-11-212-20	**CPC-PCIe/SJA1000D-GTI2S** CAN plug-in board with two CAN controllers NXP SJA1000, individual galvanic decoupling
10-11-230-20	**CPC-PCIe/SJA1000Q** CAN plug-in board with four CAN controllers NXP SJA1000
10-11-232-20	**CPC-PCIe/SJA1000Q-GTIS** CAN plug-in board with four CAN controllers NXP SJA1000, individual galvanic decoupling

2 Programming Interface

CPC-PCIe is mapped into the PC memory space with a base address assigned by the PC BIOS. The availability of the CAN controller(s) int the memory area makes the CAN communication direct and provides a low latency time. The card is identified by the following parameters:

Vendor ID	: 0x10B5
Device ID	: 0x9030
Subvendor ID	: 0x10B5
Subsystem ID	: 0x4000

A PCIe/PCI bridge is used to establish a local PCI bus on the interface card. This PCI bus is automaticly enumerated by the operating system at boot time. Furthermore CPC-PCIe incorporates a PLX9030 PCI to local bus bridge. BAR0 of the PCI configuration space register points to the bridge registers, whereas BAR2 plus an offset of 0x400 points to the first SJA1000 CAN controller. At offset 0x600, 0x800 and 0xA00 of BAR2 the optional second, third and fourth SJA1000 CAN controller can be accessed.

Please contact **EMS Dr. Thomas Wünsche** for more detailed information about the programming interface of CPC-PCIe.

3 Electrical Characteristics

3.1 Absolute Limiting Values

Any (also temporary) stress in excess of the limiting values may cause permanent damage on CPC-PCIe and connected devices.

Parameter	Min.	Max.	Unit
Storage temperature	-20	80	°C
Operating temperature*	0	60	°C
Voltage on the bus connections	-30	30	V
Current across ground connection	-	1	A

* Extended temperature range on demand

3.2 Nominal Values

Parameter	Min.	Typ.	Max.	Unit
Power supply on +3V3 Pins of the PCIe expansion slot	3,1	3,3	3,5	V
Power supply on +12V Pins of the PCIe expansion slot	11	12	13	V
Voltage on bus pins*	-30	-	30	V
Isolation voltage of galvanic decoupling between host and CAN potential	-	1000V	-	V
CAN controller clock frequency	-	16	-	MHz

* This potential is measured against the ground potential of the related CAN transceiver

4 Operating Instructions

4.1 Pin configuration of CAN connector

The CAN interface connector (D-Sub 9 male) schema complies to CiA Standard DS 102. The pin usage is detailed in the following table:

Pin	Name	Description
1	-	Reserved by CiA, not connected
2	CAN_L	CAN low bus line
3	GND	CAN Ground
4	-	Reserved by CiA, not connected
5	-	Reserved by CiA, not connected
6	-	Reserved by CiA, not connected
7	CAN_H	CAN high bus line
8	-	Reserved by CiA, not connected
9	-	Reserved by CiA, not connected

4.2 Configuration

CPC-PCIe is a Plug and Play interface and therefore does not need a configuration. The base address of the interface within the PC memory and the interrupt used is assigned by the PC BIOS.

4.3 Installation

CPC-PCIe may be installed in an empty expansion slot on the motherboard of your IBM compatible computer. To avoid damage please pay attention to the following hints:

WARNING: Computer devices and components are sensitive against static discharge. For this reason keep CPC-PCIe in the antistatic cover until installing. Just before removing CPC-PCIe from the protection cover touch the metal case of your computer.

Avoid damage by achieving equal potential between all devices on the CAN before plugging the connection.

To the rear side connector of CPC-PCIe only CAN networks with a connector and elecrical character complying with CiA DS-102 may be attached.

PC interface and CAN bus are not galvanic decoupled in the standard version of CPC-PCIe. Use in systems with diverging ground potential of PC and CAN bus is not permitted in this case.

Besides the instructions mentioned in this manual carefully observe the instructions in your coumputers user manual.

If you are not sure about the installation please contact **EMS Dr. Thomas Wünsche**.

Execute the following steps for installation:

- Disconnect your computer from the power line.
- Open the case of your computer and remove the cover of the expansion slot rear panel.
- Insert CPC-PCIe carefully into the PCIe slot. Therefore take the card at its top corners and shift it down into the slot equally. Push onto the upper side of CPC-PCIe to achieve correct seat in the slot. **If the card can not be inserted without problems, please don't use extensive force. Remove the card and retry.**
- Fix the mounting screw and close the PC housing. Connect the required cables.